

## MANURE MANAGEMENT PRACTICES TO LIMIT NUTRIENT LOSS FROM FROZEN AGRICULTURAL FIELDS

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### Abstract

Manure applied to crop areas can be an important source of plant nutrients for crop production and may improve soil quality. Relatively small amounts of nutrients especially phosphorus (P) from manure reaching water bodies can significantly increase eutrophication and impair water quality. Most recommendations indicate not to apply manure to frozen soils because the risk of nutrient loss to surface water may be increased. Our research objective was to determine the influence of manure application timing in relation to nutrient loss through snowmelt run-off. A field study was designed to compare three dates of beef feedlot manure application at 40 tons/hectare (16.2 tons/acre) on untilled soybean stubble and fall chisel plowed beans. Eight 4 m<sup>2</sup> steel frames were built in the fall on each management site to define individual plots. Treatments were randomly assigned so that each site had two control plots, two that received manure during November, two in January, and two in March. Snow melt water was collected during March and analyzed for ammonia nitrate (NH<sub>4</sub>-N), nitrate nitrogen (NO<sub>3</sub> -N), total suspended solids (TSS), total Kjeldahl nitrogen (TKN), total phosphorus (TP) and total dissolved phosphorus (TDP) from the run-off of different plots. Soil probes at 15 cm (6 in) and 50 cm (20 in) below ground were installed to monitor sub-surface soil moisture and temperatures for each plot area. Snow accumulation before and after manure application was measured. Mean comparisons of tillage and manure timing were determined with SAS. Snow melt runoff concentration of NH<sub>4</sub>-N, TP and TDP was higher in runoff from all manure application treatments compared to the control. The concentration of NH<sub>4</sub>-N, TP and TDP were significantly (LSD<sub>0.1</sub>) higher with fall chisel plowed beans compared to untilled soybean stubble. Although TP and TDP concentration was higher from manure applied during November compared to January and March, the difference was not statistically significant. However concentration of NH<sub>4</sub>-N was significantly higher in November compared to January and March which were not significantly different.

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